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BACKGROUND STATEMENTS
FOR USE IN CONNECTION WITH
1958 APPROPRIATION HEARINGS
NATIONAL INSTITUTES OF HEALTH

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BACKGROUND STATEMENT*
ON
INDIRECT COSTS OF
RESEARCH PROJECT GRANTS

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The President's Budget for the National Institutes of Health in Fiscal Year 1958 contains provision for relieving research institutions of the burden of paying the indirect costs resulting from research studies conducted under grants from the Public Health Service. The proposal is to raise the total allowance for such costs, the specific request in funds amounting to \$6.8 million.

If this proposal is implemented, the National Institutes of Health will be following a pattern similar to that practiced by the Army, Navy and Air Force for almost a decade. These agencies in their awards to research institutions provide for all of the major indirect costs associated with the conduct of research.

The Congress, by its appropriations, has recognized that it is essential for the Public Health Service to assume a portion of the indirect costs borne by research institutions receiving Public Health Service research grants. During the early years of these programs, 8 percent of the grant amount approved was established by administrative policy as the indirect costs allowance. This allowance was increased to 15 percent in 1955. This increase does not meet all indirect costs.

*Prepared February, 1957, in connection with the Fiscal Year 1958 Appropriations Requests for the National Institutes of Health, Public Health Service, Department of Health, Education, and Welfare.

As the volume of Public Health Service research grants has increased, the university funds required to defray indirect costs of grant-supported research have increased significantly. In many instances, these costs absorb a substantial portion of the total fluid funds of the institution where the research is being conducted. Some indirect costs for grant-supported research are presently being taken from the institutions' general funds and so reduce the funds available for meeting needs in other academic areas. As is well known, these needs have grown more and more serious because of the general financial pressure facing all academic institutions since the end of World War II. Costs are rising at a much more rapid rate than endowments or other sources of income.

At this point, universities and other institutions face an extraordinary dilemma. Progress in all of the sciences and progress in the arts are suffering because of the university's increasing inability to properly maintain, much less expand, facilities and training to meet expanded enrollments. While the humanistic traditions of the university suffer most at the present, so ultimately will the medical research tradition as well. Those funds which would normally be made available for teaching and to swell the future research potential will also be diverted in part to current indirect costs of research.

The question of what should constitute the precise level of support for indirect costs as related to grant-supported

research has been posed for many years. General principles for determination of such costs were established by the Department of Defense in 1947 and were incorporated into their Procurement Regulations in 1949. At the present time, representatives of the Bureau of the Budget and of all Government agencies concerned with the support of medical research are seeking together to develop a workable statement of policy which will define overhead costs for uniform application throughout the Government research grants and contract programs and establish an equitable method for indirect cost determinations at nonfederal institutions. If such a policy can be established for uniform application by all Government granting agencies, it is hoped that these determinations can be negotiated by a single central Federal organization.

Until such a central organization is erected, the National Institutes of Health proposes to continue to determine the indirect costs for each individual grant project. It should be noted that although 25 percent is proposed as the base for meeting overhead costs, the actual percentage granted to individual institutions may be either below or above this figure, depending upon the cost situation in each individual case. The total of \$6.8 million requested by the National Institutes of Health for Fiscal Year 1958 foresees an actual average payment of approximately ²⁵~~23~~ percent for overhead costs.

BACKGROUND STATEMENT*
ON
RESEARCH IN THE
BIOLOGICAL ASPECTS
OF AGING

The National Institutes of Health feels that there is a need for increased research in aging, and is keenly aware of the responsibility to stimulate additional research and training in this field. The following is a statement of the need for research in the biological and related aspects of aging, a summary on the existing intramural and research grants programs in this field, the plans for future development, and the budgetary impact.

NEED FOR RESEARCH IN AGING

There is a need for both basic research and applied research in the field of aging. In this field, the term basic research refers to investigations that try to answer the fundamental question of what the aging process actually is. At the present time, we cannot say with certainty how much, if any, of the process of aging in a living person (or other living thing) is the result of the passage of time per se and how much it is the cumulative result of a series of disease processes and injuries, major or minor. Much research has been done, at the National Institutes of Health and elsewhere, in an

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attempt to answer this question, but much more information is needed before the question can be answered precisely and fully. In this same field there is the subsidiary question of the normal life span. Is there such a thing as a normal life span, or is our average life expectancy of three score and ten the result of disease and injury which could be partially or completely controlled or eliminated?

Applied research in aging concerns itself with the problems of actual people in old age. It is clear that the increasing numbers of older people mean that we must do much more on an organized basis than we have done in the past. But there are many unsolved questions as to how the problem can best be met. Here, again much work has been done, yet much remains before we can determine how we can best utilize the limited resources that are available to take care of the older age groups. How can people be psychologically prepared for growing old? How can society give older people the feeling of being needed, and best utilize their services, both to keep them from vegetating and to obtain the goods and services that they can contribute? What are the best relationships between older people and their families, and how can these relationships be encouraged and developed? When older persons need assistance in the tasks of daily living, or actual medical care, how can such assistance and care best and most effectively and most efficiently be given to them?

These are only a few of the questions to which answers must be sought. In view of the increasing magnitude of the problem as a whole, and of the large amounts of money that will have to be spent in meeting the needs of older people in the next few decades, it seems obvious that a relatively small expenditure on research in the immediate future, to try to get answers to some of these questions, will almost certainly result in a tremendous cash saving in years to come, aside from the humanitarian considerations of doing the best that can be done for our older citizens.

CURRENT NIH RESEARCH IN AGING

Although there would be some justification for saying that practically all of the research conducted and much of that supported by the National Institutes of Health has some relationship to aging, the present discussion is limited to those projects that have a reasonably direct relationship.

There are two intramural programs that are wholly concerned with the problems of aging. One of these, operated by the National Heart Institute, is located at the Baltimore City Hospitals, where laboratory and clinical facilities are available. This program has been in continuous operation since 1940 and has been the basis of over 200 reports in the scientific literature.

The second specific research program in aging is conducted by the National Institute of Mental Health at the

Clinical Center. This program, which has been in operation for several years, has studied the effect of age upon the mind and nervous system, as well as the related sociological and behavioral questions.

In addition to these two specific programs, substantial portions of the intramural research conducted by each of the Institutes and of the extramural research supported by the whole research grants program are considered to have significance in the field of aging. Taking account of the difficulty in arriving at a precise definition of what constitutes research in aging, it is currently estimated that the NIH is devoting about \$2,000,000 a year to gerontological research studies, divided about equally between direct operations and research grants.

PLANS FOR FUTURE DEVELOPMENT--CENTER FOR AGING RESEARCH

As an expression of PHS-NIH interest in stimulating increased activity in the general field of research in aging, the Center for Research in Aging was established in the NIH in the fall of 1956. While it is expected that there will be some expansion of the two intramural programs specifically concerned with aging, as well as some shift of emphasis in the other intramural programs toward greater concern with the field of aging, the major NIH effort in this field will be in the extramural area.

The Center for Research in Aging has the following objectives and functions:

1. To assist and stimulate research investigations in the field of aging,
2. To assist in promoting the coordination of intramural research programs on aging,
3. To provide liaison between the National Institutes of Health and other organizations conducting research in this field,
4. To collect and disseminate scientific data related to research on aging, and
5. To foster the training of additional investigators to carry on research in the field of aging.

At their meetings in October and November, 1956, all of the National Advisory Councils approved the establishment of the Center for Research in Aging, as well as the underlying thesis that increased emphasis should be placed upon research and training in the field of aging. In addition, the National Advisory Heart Council approved in principle a proposal that a few interested groups be encouraged to develop large university-centered centers for interdisciplinary research and training in this field.

These centers will be operated by the universities and supported in part by research grants, but it is expected that they will extend beyond the university to include other

educational institutions in the region concerned, public and private organizations devoted to the furtherance of public health, and other community activities. Any non-research functions will of course be financed from sources other than the research grants program, but it is estimated that the research and training component in each university center of this type might well merit research grant support to the extent of possibly \$250,000 a year.

The NIH will work closely with the other Bureaus of the Public Health Service, the other operating agencies of the Department of Health, Education, and Welfare, the Federal Council on Aging and other agencies, which have responsibility for other aspects of aging, such as the medical care of older persons, their housing, their employment and retirement, and their leisure time activities.

BACKGROUND STATEMENT*
ON
RESEARCH WITH GERM FREE ANIMALS

Although Louis Pasteur often spoke to his associates of how interesting it would be to raise animals on germ-free nutritive elements (and theorized in 1885 that life might be impossible in a germ-free environment) the pioneering work in this field is largely a record of progress over the past quarter-century by the Laboratory of Bacteriology of the University of Notre Dame (LOBUND). At LOBUND germ-free animals now are reared with a sufficient degree of certainty, in sufficient numbers, with adequate uniformity, and through successive generations. Germ-free research has reached a level of international significance because of the accomplishments of this laboratory.

As the promise of germ-free investigations has become increasingly apparent, efforts have multiplied to evaluate and improve methods and techniques and extend opportunities for germ-free research. Acceleration and expansion in this area involve several agencies, proceeding from a frontier opened by the LOBUND Institute.

A statement made some time ago by Director Reyniers of LOBUND (where at one time a backlog of some 200 proposals for

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germ-free research awaited additional facilities) sets forth the philosophy that led to the establishment of germ-free facilities, first, at Walter Reed Army Medical Center and, now, at the National Institutes of Health.

"The use of the germ-free tool is as clearly indicated for biological and medical research in the future as the microscope or carbon 14. The question is not shall we expand and extend the use of germ-free research, but how".

In cooperation with LOBUND, the National Institute of Allergy and Infectious Diseases of the National Institutes of Health began in 1952 to develop a reservoir of scientists experienced with the complex techniques necessary for this type of research. A description of these germ-free studies may be found in NIH Progress Report No. 22 (Sept.) 1954.

This cooperative relationship has enabled the National Institutes of Health to take the first steps toward making a significant and continuing contribution to germ-free research, along with Walter Reed Army Medical Center, where a germ-free facility recently was designed and installed by Reyniers and Company, aided by support from the Research and Development Board, Surgeon General of the Army, through contract with the University of Pennsylvania. In the national effort to extend resources for germ-free investigations, developments have included (1) research and training of NIAID scientists at LOBUND (2) planning for germ-free research at NIH, and additional special training through LOBUND of

NIH engineers to assist in this project (3) establishment and activation of a germ-free facility at NIH (4) activation of research grants to support additional germ-free research by scientists at LOBUND and elsewhere (5) consideration for additional research grant proposals which have been submitted. The present report will outline these activities.

EARLY RESEARCH FOCUSED ON AMEBIC DYSENTERY

The focal point of early germ-free research by NIAID at LOBUND was the organism causing amebic dysentery, and continuing investigations are developing significant findings about the ameba-bacteria relationship in amebiasis. When NIAID scientists inoculated this ameba into the intestines of germ-free guinea pigs, they found it apparently could not survive in this sterile environment. Since, however, the ameba is hard to culture in a sterile environment in a test tube, this was not surprising. It grows well along with certain bacteria in a test tube culture; so the scientists gave animals some bacteria, E. coli or A. aerogenes, before infecting their intestines with amebas. Ulcerative amebiasis was thus produced.

A recent step in this research has been to see if the bacteria are always necessary to help the amebas produce disease, or whether other conditions or materials can be substituted for them. When heat-treated preparations of bacteria or certain of their products were given to germ-free guinea pigs before and after inoculation with amebas, ulcerative amebiasis was again produced.

Observations of these animals provide a key to understanding the disease-producing ability of this ameba. This parasitic infection afflicts over a million people in the United States, with effects ranging from very mild to deadly. The differences may be due, in addition to varying susceptibility of different people, also to some of the factors it is now possible to study by the germ-free technique.

In the ameba-bacteria studies the presence of other germs or their by-products is the important factor in the disease-producing ability of the ameba.

This finding underscores the importance of having germ-free animals for research. Any normal laboratory animal has innumerable bacteria in its intestinal tract. When the scientist introduces an organism that is believed to be responsible for a specific disease he is adding it to bacteria already present in the intestines. Therefore, it is difficult without germ-free animals to determine the specific effects of the added disease-producing agents.

GERM-FREE ANIMALS SURVEYED FOR PARASITES

In another of the NIAID-LOBUND cooperative studies an NIAID investigator recently completed a parasitological survey of Notre Dame's germ-free animals. The results showed that the rats, mice, guinea pigs and chickens were entirely negative in that they did not in any instance demonstrate the presence of animal parasites. However, examinations of a limited number of dogs revealed the presence of nematode parasites despite the fact that such animals

were demonstrated to be bacteria-free. As the investigator points out, this condition could be prevented if the donor animal were known to be parasite-free prior to and during the pregnancy.

Cooperative work of this type with LOBUND has enabled NIAID to develop the techniques necessary for initiating a germ-free program at its Bethesda laboratories. Other Institutes at NIH also have proposed studies using germ-free animals.

FIRST GERM-FREE ANIMALS PRODUCED AT NIAID

On the morning of October 24, 1956, the head of the Germ-Free Animal Studies Section of the Laboratory of Tropical Diseases, National Institute of Allergy and Infectious Diseases, performed a Caesarean operation on a guinea pig under sterile conditions and delivered 5 young into a germ-free rearing unit. This was the initial germ-free attempt employing the ingenious equipment for this work recently installed at NIH after several years of planning. The first attempt to produce and maintain germ-free guinea pigs at NIH was a successful one.

During several weeks, no contamination occurred, according to rigid bacteriological tests. In the later phases of some of the experiments a few of the animals did become contaminated, indicating the inherent difficulties of research of this type.

The NIH germ-free facility, expected to build up to approximately 30 germ-free chambers during the next several years, is being assembled by the Sanitary Engineering Branch, NIH. Several of these units have been put into operation for initial NIAID studies which will be described.

The basic germ-free unit, designed by LOBUND, is a steel cylinder five feet long and three feet in diameter with a Pyrex viewing window in its top and a pair of arm-length rubber gloves sealed into its sides. (NIAID presently is also using chambers with gloves on each side, so that, for example, a technician can hold an animal while the scientist performs an operation.)

The unit and its contents are sterilized by steam under pressure prior to introduction of animals. Filtered air is supplied. Food, water, towels and other expendables are brought in through a small autoclave (a sterile lock) attached to the unit. Items that cannot be sterilized by live steam are brought in through a trap, where they are immersed in germicide. The sterile lock also permits removal of animals, waste products and cultures from the cage without contaminating the inner chamber.

When a disease-producing agent is introduced into the animals the apparatus has the advantage of confining the organism so that it cannot escape the chamber and infect laboratory personnel.

Some baby germ-free animals are fed special milk formulas through special equipment similar to eyedroppers, since they must not suckle the "contaminated" mother. Efforts to have germ-free animals reproduce themselves have been successful. Eggs, the shells of which have been sterilized, are a source of germ-free chicks.

CURRENT GERM-FREE RESEARCH ON TRICHOMONAS VAGINALIS

Currently, the Laboratory of Tropical Diseases is undertaking to establish Trichomonas vaginalis infections in germ-free guinea pigs. This protozoan parasite is associated with a variable clinical picture in women, ranging from infection without symptoms to marked vaginitis. The bacterial flora is undoubtedly a factor in such infections. Thus, it has been difficult to assess the virulence of the trichomonad and to establish whether there are strain differences associated with the variable pathology. A study of the parasite in a host without the presence of bacteria may provide information on this disease.

The NIAID investigators plan, in another study, to follow the progress and development of parasitic intestinal nematodes. Certain of these worm-parasites may gain entry into the host by burrowing through the skin and migrating through such tissues as the lungs. Host specificity is quite marked in such species--that is, they are able to survive only under the favorable conditions provided by a certain type host--and penetrating nematode larvae may be stopped by defenses at various sites in the body of a host that is not its "normal" habitat. Inasmuch as the germ-free animal would, theoretically, provide an immunologically inexperienced host, it could provide information in the broad area of host specificity and natural resistance. The investigators will observe whether the nematode is able to penetrate to the intestines of the germ-free animal without effective resistance, since this animal has had no microbiological "battle experience."

Prior to initiating program of research in allergy as an adjunct to studies of the infectious diseases, the National Institute of Allergy and Infectious Diseases was known as the National Microbiological Institute. This area of microbiology has been and continues to be one in which investigators are accustomed to meet the type of problems that are likely to arise during the planning and conduct of germ-free work.

GERM-FREE RESEARCH ON SHOCK AND LONGEVITY

Interest in having germ-free animals available for research has been expressed by several Institutes, and some of the possibilities for various investigations were outlined in Research Progress Report No. 22.

NIAMD envisions studies which might lead to a major advance in control or prevention of surgical shock. A current theory is that this serious condition may be produced by disturbances which cause the release of bacterial toxins from the intestines. Germ-free animals may be the tool for determining the validity of this theory.

The long and vigorous life enjoyed by individuals in some localities has been attributed, without, however, real proof, to the effect of their diets on intestinal bacteria. Research with germ-free animals might provide proof for this theory with all its implications for improved health, vigor and longevity of the population.

Perhaps of more immediate practical significance would be the knowledge which could be gained from research with germ-free animals of the effects of antibiotics now being added to animal feed. Startling increases in rates of growth of the animals have been produced but much more precise knowledge of how these growth increases are produced, and of possible unfavorable effects of antibiotics in feed, must be obtained before antibiotics can be considered as food additives for humans.

Other studies might include observations on tissue reactions to burns--now impossible to study adequately because of interfering bacteria, and work on radiation fatalities to determine whether it is the radiation or the subsequent bacterial infection that is most likely to kill.

TRUCK TRANSPORTS GERM-FREE ANIMALS

Early in 1957, Dr. Reyniers of LOBUND met at the National Institute of Allergy and Infectious Diseases with the NIH researchers who are developing germ-free facilities there. He brought with him a most recent innovation--a truck adapted to transport germ-free animals. The truck, donated by the Studebaker Corporation (which, like LOBUND, is located at South Bend, Indiana) is air conditioned and equipped to operate continuously an air-compressor which pumps purified air into the chamber for the germ-free animals. Designing and developing

germ-free equipment for the truck was done under a grant from the Surgeon General of the Army. Bringing new mobility to these animals, the vehicle, is symbolic, perhaps, of LOBUND's mission to make germ-free studies available throughout the entire structure of medical research today.

Dr. Reyniers says: "It is clearly indicated in the national interest to make animals, techniques and facilities more widely available to scientists. It is anticipated that facilities will be established elsewhere, but germ-free research is not a field which can be entered casually. . . ."

More than casual consideration is being given to the problems inherent in this work, and among the groups which have made recommendations for improving germ-free procedures and research has been an ad hoc committee selected by the Federation of American Societies for Experimental Biology at the request of the National Science Foundation. During the summer of 1955, the Committee was asked to examine the general problem of the "germ-free" animal, including its usefulness and potentialities as a tool in basic and other research. The Committee was further requested to consider, the problem of facilities for producing such animals and for using them in the conduct of research.

Although this Committee noted, " there is common agreement that the technique is useful in many different areas of research and that further research dealing with germ-free animals should be encouraged," the conclusions in its report of

1956 pointed out a number of areas in which the committee believed improvements might be made. Recent cooperative work between LOBUND and NIAID has emphasized research and planning to implement certain of the recommendations of this Committee.

Among the research grants which have been made in the direction of the National Science Foundation Committee recommendations are those which will study improved methods, including simplified equipment.

The overall increase in germ-free grants and grant proposals at NIH is one indication of the growing interest in this type of research.

LOW-COST PLYWOOD APPARATUS FOR GERM-FREE MONKEYS

One recently-approved NIAID grant (to the Syracuse University Research Institute) will make possible studies on the design, construction and evaluation of low cost plywood apparatus for obtaining, rearing and handling germ-free monkeys. This work is for a future study involving germ-free monkeys which will be contaminated with known pure cultures of microorganisms, in order to determine certain aspects of the biologic role of individual intestinal microorganisms.

Another active NIAID grant (to LOBUND) will use germ-free animals in attempts to isolate and characterize agents which are related to the group of diseases ordinarily classified as the "Common cold." A second grant-supported study at Notre Dame

is directed toward rearing and studying the germ-free animals themselves. As the investigator points out: ". it is apparent that without data on the characteristics of the germ-free animal, its usefulness in 'applied' research will be limited."

A longevity study of germ-free mice (no longevity studies of germ-free vertebrates have ever been reported) is among proposals for germ-free research awaiting consideration by the National Advisory Council on Allergy and Infectious Diseases.

GERM-FREE RESEARCH ON DENTAL CARIES

The National Institute of Dental Research has awarded a grant for a continuation study of dental caries in germ-free animals. Investigators at the Zoller Clinic, University of Chicago will employ animals reared under completely germ-free conditions to study the normal periodontium without the influence of pathogenic or non-pathogenic microorganisms. Aside from current short term observations on the normal periodontal state, the germ-free rat can now also be maintained for extended periods over a year wherein gingival and periodontal disease might well be manifested. Conventional control rats would need to be studied concurrently, of course.

Pioneer studies at LOBUND, although somewhat limited in scope so far as dental aspects are concerned, seemed to show that rat dental caries is not possible in a germ-free environment. One of the problems peculiar to dental research in

germ-free work is that of finding proper diets. Work which has previously been done in NIDR with the heat processing of foods will aid materially in setting up this important phase of the greatly enlarged program which NIDR now has an opportunity to build.

Early in 1957 additional research grant applications were received at NIH for consideration by the advisory councils meeting in March. These proposed (1) work which would improve LOBUND's germ-free equipment, which is not as modern as the equipment installed in the new facilities at Walter Reed Army Medical Center and at NIH. (2) design and construction at LOBUND of low-cost plastic chambers, and studies to compare units of this type with the stainless steel isolators now in use.

BACKGROUND STATEMENT*
ON
CONSTRUCTION AT BETHESDA

At the present time, there are several construction projects either in progress or planned at the National Institutes of Health in Bethesda. They are considered together here because each of them has been a matter of special Congressional attention and interest. They are:

- ... A laboratory for the Division of Biologics Standards.
- ... Additional animal facilities, planned for temporary use as offices.
- ... A wing on the Clinical Center with specialized facilities for neurosurgery and cardiovascular surgery.
- ... A Residential Treatment Center for care and study of disturbed children under a program of the Mental Health Institute's Child Research Branch.
- ... A research laboratory for the National Institute of Dental Research.
- ... A permanent office building.

Funds for the first four have been appropriated. They are either under construction or committed for construction to begin in 1957-58. The last two are authorized only to the extent of planning, and funds for their construction are not included in the President's 1958 budget proposal.

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Each of these buildings promises to contribute significantly to the general environment and to the capacity of the National Institutes of Health to undertake and carry out productive research in its areas of statutory responsibility. Progress in their planning and construction has been gratifying in specific instances, but slow in the aggregate. There have been four major factors involved in the delays while all do not pertain to each construction project, it may be helpful to consider them together as contributing to the inability to move forward with all projects as rapidly as had been hoped.

1. The Public Buildings Service of the General Services Administration has primary responsibility for the design and construction of our buildings. In the face of a severe reduction in force in its technical personnel several years ago, it has now been extremely pressed to handle the incoming work in the last two years. Its major unmet commitments are in the lend-lease construction field. As a matter of policy and of staffing necessity, the planning and design of a new building project now must be handled through Public Buildings Service by an outside architectural contractor. These contractual negotiations have represented an added time factor in making progress on Bethesda construction slower than had been hoped.

2. A second time factor relates to the financial relationships with the Department of Health, Education and Welfare and the Bureau of the Budget. All but one of the current construction projects resulted from Appropriations Committee and Congressional action for which no specific proposal had been made. As a result, there did not take place the usual extensive planning and discussion which ordinarily involves the program officials and the Bureau of the Budget prior to the forwarding of a request to the Congress. The Bureau of the Budget, therefore, held release of apportionments for planning these structures until it had an opportunity to see the physical and financial requirements, as well as the master site plan into which the new structures must fit.

3. With the completion of the Clinical Center, and with no further construction projects immediately in sight, it was necessary to abolish the Research Facilities Planning Branch and cut back the Design staff of the Plant Engineering Branch--units which bear the primary responsibility for new construction and the maintenance of existing facilities at Bethesda. The staffs were relocated elsewhere in the Service and within and outside of Government. Because of the acute national shortage of such specialized engineering skills, it was not possible to reconstitute these groups quickly in the light of what on short notice became another major building program at the National Institutes of Health. The

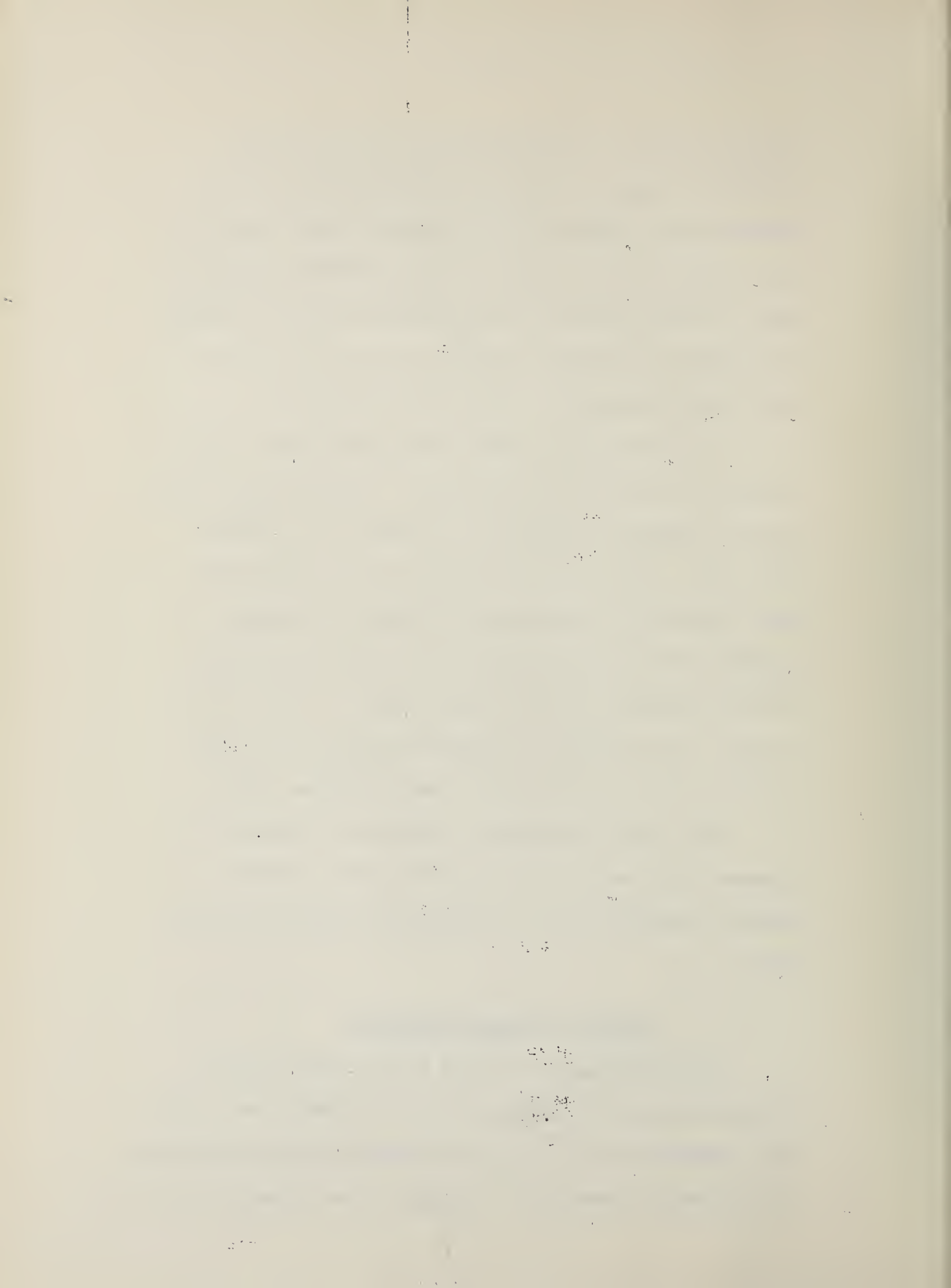
groups are even now operating without the services of several key engineers, but every effort is being made to recruit them. This is difficult because salary levels are not competitive with industry's. This staffing problem has been a factor in some of the construction delays in firming up specific functional requirements for use by the PBS in negotiating arrangements with specific architects.

4. A fourth time factor has been the unique aspects of some of the facilities themselves. The new surgical wing and the Residential Treatment Center serve to illustrate this point. There is no precedent for these structures. Each poses highly individualized problems--and unless planned with extreme care, they could fail to fill their intended purposes with full effectiveness. In cases such as these, the time spent in painstaking study and design is well spent if it helps avoid costly mistakes later.

With these four general factors as a backdrop, the present status and future outlook for each of the six current building projects at Bethesda can come into better focus.

BIOLOGICS STANDARDS BUILDING

The 84th Congress provided \$3.5 million under the Second Supplemental Appropriation Act of 1956 for the design and construction of a Biologics Standards Laboratory Building at the National Institutes of Health. After tentative drawings



and structural criteria, similar to Building No. 6 which is the Cancer building were furnished to the Public Buildings Service, they were requested to proceed with design for construction. A contract was made with Mr. Ted Englehardt on July 27, 1956, for design and preparation of plans and specifications. The contract architect's tentative plans were approved by NIH on October 26, 1956. Considerable delay was experienced in developing the tentative plans because of lack of agreement between the architect and PBS on what kind and size of structure could be achieved within the available funds.

The PBS adjusted the overall time schedule in November after further consultation with the architect. This schedule provides for completion of plans on May 1, 1957, and awarding of the contract for construction on June 30, 1957. It is presently estimated that construction will be completed by March 1959. This date is some months later than the original expectation at the time funds were sought.

The architect is now proceeding with the design of construction plans and specifications. The architect is expected to submit working drawings for intermediate review on February 15, 1957.

ANIMAL FACILITIES FOR TEMPORARY OFFICE USE

The Second Supplemental Appropriations Act of the 84th Congress provided \$1,371,000 for the design and con-

struction of animal facilities to be used temporarily as office space. The Surgeon General of the Public Health Service forwarded a letter to the Public Buildings Service on August 3, outlining the acute office space needs at the National Institutes of Health to house the expected grants and training programs. He requested that the proposed project be expedited through use of a negotiated contract.

On September 15, PBS provided the NIH with final construction plans for this facility which were in turn submitted to the Bureau of the Budget for approval. In subsequent discussions, NIH was asked to consider modification of the plans presented to reduce the overall cost. NIH was not able to concur with the recommended changes, and after a series of discussions and requests for supplementary information, word was received on November 19 that this project might proceed under the original plans. PBS then expedited soliciting of bids and negotiation of a contract for construction.

On December 18, the contract was awarded to the John A. Volpe Construction Company in the amount of \$1,116,000 for construction and the PBS gave notice on December 26, 1956, for the contractor to proceed. Because of rising costs and materials shortages, a 240 day rather than a 120 day construction period needed to be provided in the contract. Completion date is set at August 28, 1957. Work was begun on December 28 and is proceeding according to schedule.

SURGICAL FACILITIES

On June 29, 1956, the 84th Congress authorized the expenditure of \$1,630,000 for the construction of new surgical facilities at the National Institutes of Health. These facilities were to provide for the increased needs in cardiovascular surgery and neurosurgery.

During July 1956, initial funds were transferred to PBS with the request that they proceed immediately with development of design and construction. A Bureau of the Budget architect, Mr. Childs, visited NIH during the latter part of July to discuss construction plans and look at the existing facilities and proposed construction site. Subsequent to this, requests were received from the Bureau of Budget for additional justification and schematic drawings for their approval prior to obligation of apportioned funds. Authorization to obligate \$35,000 of the apportioned funds was received on August 13, at which time PBS began negotiations with an architect to develop the necessary plans and specifications.

During the remainder of August and in September and October, additional information was supplied to the Bureau of the Budget, until on October 16, the Bureau had approved apportionment of sufficient funds (\$73,000) to cover the total cost of plans and specifications.

Additional discussions, without conclusive results, have since taken place because of the Bureau's lack of agreement on the extent to which auxilliary services need to be included within the surgical suite as originally proposed.

The contract was awarded to the architectural firm of York and Sawyer, New York. During the latter part of October and prior to the actual letter of contract, Mr. Kiff and Mr. Franklin of York and Sawyer visited NIH to review the program of requirements which had been submitted by NIH through the PBS. The tentative schedule set by PBS at this time was completion of plans and specifications by July 1, 1957, awarding of contract by September 1, 1957, and completion of construction by September 1, 1958. This schedule, which may still be optimistic by several months, is a number of months later than the schedule originally proposed.

On November 19, 1956, the contract architect submitted copies of the program of requirements prepared by his firm. This was based on the original submission from NIH and the firm's subsequent discussions with NIH personnel. The program of requirements prepared by the contract architect is now being studied by NIH.

Latest estimates place completion of plans on November 1, 1957; awarding of contract on January 1, 1958; and completion of construction on January 1, 1959.

RESIDENTIAL TREATMENT CENTER

The needs for this facility first came up in discussion at Congressional hearings in the spring of 1955. Subsequently, authorization was received in the regular Fiscal Year 1956 appropriation for the construction of cottage-type facilities designed to provide a suitable, non-institutional environment for disturbed children who had been under observation and treatment in the Clinical Center and were ready in progressive stages to undertake readjustment to home and community surroundings.

This structure is now virtually complete, the basic equipment is on order, and planning is under way for those services which this group and the staff working with them should receive from the Clinical Center proper, as contrasted with those they should have incorporated in the staffing and facilities of the Residential Treatment Center itself in order to make it homelike.

According to present schedules, the first group of children will be moved into this new building in April, 1957.

Note: Construction funds for the next two projects, for which planning funds were provided by the 2nd Session of the 84th Congress, are not included in the Administration's budget submission for Fiscal Year 1958, based on a general policy which defers all except the most urgent construction because of national fiscal considerations.

DENTAL RESEARCH BUILDING

On June 24, 1948, the 80th Congress authorized the National Institutes of Health to proceed with preparing plans and specifications for a new dental research building with a maximum cost limitation of \$2,000,000. Plans were prepared to about 90 percent completion, but funds were not appropriated for construction.

A new dental research building was again authorized by the 84th Congress on July 31, 1956. Congress provided \$200,000 for preparation of plans and specifications for a \$4,000,000 building. The PBS was requested by NIH to proceed with this project on August 29, 1956. After preliminary negotiations with a contract architect, it was necessary for NIH to advise that action should be withheld on the project because the Bureau of the Budget felt that in the light of the volume of new construction at Bethesda, it should review a Master Plot Plan for the NIH grounds prior to releasing the \$200,000. The Plot Plan was prepared by PBS with the assistance of consultants from the New York firm of Clarke and Rapuano, and the NIH was advised of the Bureau of the Budget's release of funds on December 31, 1957.

The tentative program of requirements for the Dental Research Building has been prepared for PBS, together with justification for revision of the old set of plans pre-

pared under the original authorization. A contract with an architectural firm for the design of this building is being negotiated by PBS at the present time. It is too early to establish a target date for completion of plans and specifications, but it will probably be six months after the letting of contracts.

GENERAL OFFICE BUILDING

The Second Supplemental Appropriations Act of 1957 provided \$300,000 in planning funds for a \$5,000,000 general office building at the National Institutes of Health. The original schedule called for completion of plans by May 1, 1957. NIH formally requested PBS to proceed with developing plans and specifications for this building on August 29, 1956. On August 30, the Bureau of the Budget placed the \$300,000 in reserve on the basis of the Bureau of the Budget's interest in discussing HEW-NIH land utilization prior to release of funds for this project.

By December 31, 1956, detailed information on a Master Plot Plan for the NIH reservation, including all presently planned construction, was furnished to the Bureau of the Budget, together with supplemental information on utilization of the proposed office building, as requested. NIH advised PBS on January 2, 1957, that the Bureau of the Budget had released the funds for plans and specifications and asked that they proceed with formalizing a contract with the tentatively selected archi-

tects. A detailed program of requirements for this construction has been completed, and PBS expects to formalize the contract with the architects in the very near future. Plans have not yet been finally set, however, for this.

BACKGROUND STATEMENT*
ON
THE CLINICAL CENTER

NECESSITY OF CLINICAL RESEARCH

The preponderance of money and manpower devoted to medical research today is very wisely being used in basic laboratory investigations. Clinical research, however, is equally indispensable to continued progress against the diseases and infirmities of man. There are three main purposes of research conducted in man rather than the lower animals or in the test tubes and microscopes of fundamental science.

From observations of the sick human come many clues as to the cause and course of illness--clues which can be investigated effectively only at the basic science level.

From observations of physiological and biochemical process in normal, healthy individuals are obtained the base lines needed to recognize, trace, alter and evaluate related phenomena observed in ill persons.

Every new concept, treatment, diagnostic procedure, preventive method or restorative technique developed in the basic science laboratory which shows promise for human medicine must ultimately undergo exhaustive testing and evaluation in human beings before its real worth can be known.

*Prepared February, 1957, in connection with the Fiscal Year 1958 Appropriations Requests for the National Institutes of Health, Public Health Service, Department of Health, Education and Welfare.

These, then, are the primary roles of the Clinical Center of the National Institutes of Health: To provide valid clues for fundamental laboratory study; to enable base line observations on normal individuals to be made; and to accelerate bridging the gaps between laboratory promise and medical fulfillment.

When National Institutes of Health research was on a relatively small scale and devoted largely to communicable disease, clinical study could be "farmed out" to other institutions or conducted at the site of epidemic outbreaks of the diseases being investigated. Even so, the lack of a clinical research facility seriously hampered the scope and effectiveness of the program.

But when changing national health patterns led the Congress to authorize a large expansion of National Institutes of Health research in the serious chronic illness, a clinical program at Bethesda became imperative. That program is symbolized physically and organizationally by the Clinical Center which, opened in mid-1953, is just now approaching maximum function.

THE ROLE OF THE CLINICAL CENTER

Rather than construct and staff separate research hospitals for each of the seven Institutes, NIH decided that for scientific coordination as well as money-saving reasons, the seven clinical programs should share the same building. For similar reasons, plus the extra assurance of consistently high standards of patient care, it was decided that services needed for patients of all Institutes would be provided by a central patient care organization

and hospital administrative staff. Thus, grew into being a patient care program not unlike those found in the best university and other general hospitals throughout the country.

The interrelationships between this central organization and the seven Institute clinical programs is necessarily complex, but has proved workable and suited to the unique needs at Bethesda.

The basic philosophy of these relationships is that the sick human being who is accepted by NIH in order that he may provide knowledge needed in the research program deserves and must receive the best possible hospital care. This is required not only for the patient's welfare but also for the validity and effectiveness of the research program in which he takes part.

Necessary medical and surgical services are provided by physicians of the Institute in which the patient is being studied. The standard hospital services such as nursing care, dietary, diagnostic X-ray and laboratory tests, rehabilitation and social services are provided by the Clinical Center central organization. Other important central services to institute clinical programs include medical records, religious ministry, recreation, admission and followup services and housekeeping. Liaison with referring physicians, medical societies and hospital accrediting agencies, likewise are among other essential activities coordinated or carried out by the Clinical Center.

Broad medical policies are recommended by a Medical Board appointed by the Director of National Institutes of Health from

among top medical personnel of the Institutes and the Clinical Center staff. When approved by the National Institutes of Health Director these policies become binding on all staff members concerned with clinical research and patient care. They are coordinated and largely administered by the Director of the Clinical Center who also serves as the principal staff Advisor to the Director, National Institutes of Health, on the non-research aspects of the clinical program.

SELECTION OF PATIENTS AND MEDICAL SERVICES

Patients are selected by Institute clinical investigators solely on the basis of having been referred by their own physicians and possessing a form and stage of illness specifically needed on a clinical research project. Institute physicians who have been selected especially for their competence in caring for sick persons provide medical and surgical attention needed by the patient while taking part in a study. Upon discharge, the patient's referring physician is sent a full report on findings and where indicated, recommendations which may be helpful in his further management of the patient's illness. Often a patient may take part in several studies in more than one Institute.

CENTRAL PATIENT CARE SERVICES

As has been stated, the Clinical Center patient must receive all necessary hospital services. Experience has shown, however, their range and exactitude must far exceed similar services provided

by most hospitals, where the objective is limited, necessarily, to maximum benefit to the patient rather than this: plus acquisition of new knowledge. In fact, the research mission of the Clinical Center, requires that these "routine" services must approach research techniques in their precision and range.

Some of the more important patient care services rendered by the Clinical Center in support of Institute research programs are as follows:

Nursing Services

The Nursing Department provides those nursing services and functions which are vital to the safety and well being of the patient under treatment and to the effective cooperation and participation of patients in the research studies. The nurse must be well oriented to the research program in which she functions and have a complete understanding of her part in that program.

Research observations and recording provided by the nursing staff are crucial to most of the clinical research projects.

In Neurological Nursing for example, the details of epileptic seizures in patients are of utmost importance to the physicians conducting research on that disease. The nurse must be alert to the seizure onset so that she can dictate her observations during the seizure and at the same time, render the necessary nursing assistance to the patient. An accurate, running account of the seizure dictated to a recording machine is essential. Therefore, the nurse

on duty with the patient must be alert to the slightest change, always ready to describe accurately a series of rapidly changing symptoms and, at the same time, to render the physical assistance needed by the patient. The vigil is a continuous one, involving three nurses in a twenty-four hour period and extending until sufficient data has been secured to provide the physician with the information required for the study in progress.

Diagnostic X-ray

The objective of this Department is to provide a complete diagnostic radiological service for the various Institutes of the National Institutes of Health. These services are as essential to the research program as they are to patient care, many clinical research projects being monitored and guided by radiographic control. Baseline X-ray studies on patients are obtained at the onset of their entry on a research project and the response to the various types of therapy are determined by periodic X-ray examinations. Without radiographic control, many of the clinical research activities could not be successfully consummated. For example, pulmonary angiograms needed on studies of lung cancer are performed periodically to determine the response of neoplasms within the lung fields to the instillation of drugs into the pulmonary vessels by means of catheters.

A number of new techniques and devices have been developed by this department to meet the special requirements of Institute investigators. In addition, numerous carefully controlled

evaluations have been conducted on opaqueing substances which are less dangerous than those in common use.

Anesthesiology Department

The objective of the Anesthesiology Department is to provide safe, effective anesthesia and supportive therapy for patients undergoing major surgical procedures by the surgical services of the several Institutes. This sphere of activity includes the assignment of anesthesiologists to "standby" duties during certain diagnostic procedures not requiring anesthesia, but where circulatory and respiratory depressions of an emergency nature are anticipated. A second objective is to provide for the types of inhalation therapy frequently needed in the care of Clinical Center patients.

Several Institutes have research projects requiring prolonged surgery, and frequently involving simultaneous use of electrical recording apparatus. This presents difficult problems in the anesthesiology since some of the most effective agents are highly explosive gases. Consequently, the Anesthesiology Department has had to develop various combinations of non-explosive agents which have proved adequate to the needs both of the patient and of the research surgeons.

Surgical Pathology and Post-Mortem Service

The objectives of the Surgical Pathology and Postmortem Service in the Clinical Center are twofold: first, to furnish a diagnostic service in autopsy and surgically removed tissues, and

second, to aid from a morphological standpoint the various clinical research problems which are under study in the Clinical Center.

The methods used are those standard methods which involve description of organs and tissues, fixing and sectioning of this material and the preparation of histological slides. These methods include preparation methods usually used in a Pathologic Anatomy Department and in addition because of the many problems of investigators, the use of a wide variety of special staining procedures.

Pharmacy and Sterile Supply Service

Institute clinical research programs are furnished all necessary pharmaceuticals and sterile supplies by this Clinical Center department.

Special oral preparations, sterile filtration products and sterile intravenous solutions of new and specialized research drugs, which are a small proportion of the production of the pharmacy in the typical general hospital, are major functions of the Clinical Center Pharmacy Department. In addition, the pharmacists continually consult and cooperate with research investigators in developing better end products for use in research studies.

The steril supply service, in addition to the wide variety of sterile, specially prepared, and specially packaged items characteristic of normal hospital operations, furnishes many

special services not usually provided, such as special trays designed for specific research studies, the preparation of surgical linens and packs for research surgical procedures and the maintenance of an extensive medical and patient care equipment loan service.

Clinical Pathology Department

This department provides consultation and laboratory services in hematology, clinical chemistry, microbiology and special diagnostic procedures, essential to the welfare of all hospitalized patients and to the conduct of many clinical : research projects as well. In the Clinical Center provision of these services deviates significantly in many ways from the operation of a Clinical Pathology Department in a teaching hospital for the following reasons:

1. There is a much higher proportion of time-consuming, precise, complex tests.
2. It is necessary to employ higher grade, specially trained technologists, to carry out these complex procedures.
3. Special instrumentation is required to carry out the precise tests and techniques required for research procedures.
4. There is a greater number of tests performed per patient for medical care related to research than for normal care.

5. Definitive research in the field of laboratory methods is being done because of the constant modification of standard tests procedures and the development of new methods is required to keep up with rapidly advancing research in medicine.

Rehabilitation Department

The purpose and methods of Clinical Center rehabilitation services are substantially the same as those in the best teaching hospitals, modified to some extent by the special needs of the Institute research programs. In essence, rehabilitation seeks to restore the treated patient to the maximum physical, mental and social functioning of which he is capable, thus consolidating and insuring continuity of the gains made by the clinician in eliminating or minimizing the disease process for which the patient is hospitalized. The department provides occupational therapy, physical medicine and recreational and vocational therapy programs to the various participating Institutes.

Service Functions

This group of functions is located organizationally in the Office of the Administrative Officer of the Clinical Center and includes administrative services, employee health services, visitor reception and guide service and intra-mural transportation services.

Administrative Services Section. This unit encompasses a variety of peak load clerical and stenographic assignments

for such services as typing, transcribing and filing on short-term assignments to obtain full utilization of personnel.

NIH Employee Health and Dental Services. Pre-employment physical examinations and emergency treatment of service-connected injuries and illnesses and the maintenance of a preventive medicine program for employees working with hazardous materials or in hazardous situations are the primary functions of these services.

Reception and Guide Service. The Reception and Guide Service is responsible for the over-all direction of visitor traffic, including visits to patients, visits from the general public, medical, social and other groups in all public areas of the building for 16 hours a day, 7 days a week.

Transportation Service. Control and flow of materials to and from the building and between areas of the building are the prime responsibilities of this unit.

Housekeeping Section

The Housekeeping Section is responsible for maintaining the highest standard of hospital cleanliness of 23 patient units, the child-care cottage, 1100 laboratory modules and all of the public areas in the Clinical Center building. There are many specialized techniques necessary in order not to introduce contaminants into chemical procedures, to avoid injuring animals, etc. Passenger elevator service is also the responsibility of this section.

Nutrition Department

In addition to all the standard and special diets that would be made available in any good hospital, many Clinical Center patients must be provided with special metabolic diets needed for research purposes. These diets must be prepared with extraordinary care in order to meet and maintain the precise standards set by the investigators. Special kitchens and highly trained professional dieticians are assigned to work intimately with the clinical research teams to meet these and other research requirements such as diet instruction of patients, diet histories, and special consultations.

This department also operates a non-profit cafeteria for use by NIH employees and visitors.

Medical Records Department

Medical records are vital in any hospital. In a research hospital, they are doubly so since clinical research is totally dependent on maintaining complete records on every aspect of diagnosis, treatment and study. Therefore, the objectives of this Clinical Center department may be described briefly as:

1. To insure the accuracy and completeness of all medical records of patients in the Clinical Center; to constantly examine their contents and maintain the standards of the Clinical Center and the Joint Commission on Accreditation of Hospitals.

2. To maintain permanent indexes on diseases and manifestations and operations according to the Standard Nomenclature of Diseases and Operations for the purpose of providing basic data to physicians conducting medical research.
3. To maintain a permanent index on clinical research projects, a compilation of which is distributed at regular intervals to authorized administrative, clinical and research directors.
4. To routinely compile and distribute statistical data regarding patient care which is utilized by administrative and research personnel.
5. To cooperate with the professional staff in accomplishing the objectives of the Clinical Center.

Social Service Department

The Social Service Department provides service to the Clinical Center and to the clinical investigator in the following areas:

1. Preadmission studies of potential research patients considering such factors as family and other socio-economic conditions which determine the individual's suitability as a research patient.
2. Preadmission studies of prospective patients directed toward facilitating this admission by arranging for their coming, planning with community

agencies to help stabilize family conditions during the patient's absence from the home, identifying problems which might cause the patient to leave before completion of the research studies relative to his admission, and trying to provide solutions for them.

3. Ascertaining that adequate medical facilities are available for the care of the patient after the research phase is completed and the patient is discharged from the Clinical Center.
4. Inpatient services, directed toward the maintenance of patient morale and comfort at the highest possible level so that the patient remains a satisfactory research subject.
5. Followup studies to evaluate the adjustment of patients following treatment, so as to provide the medical staff with data necessary to them in their research.

Admissions and Followup Department

Admissions and discharges of inpatients and the scheduling of ancillary service to followup patients, closely coordinated with the needs of the clinicians of the seven Institutes are the responsibilities of the Admissions and Followup Department, together with the clerical records necessary for proper followup of discharged patients and the maintenance of a centralized appointment system for all followup patients.

BACKGROUND STATEMENT*
ON
DIVISION OF BUSINESS OPERATIONS

The Division of Business Operations was established a year ago - on January 1, 1956. The business-type services provided by this Division are those dealing with the furnishing of men, money and materials to the research programs. Since the costs of these services represent indirect costs of research, the financing of the Division is shared cooperatively by the several research Institutes of the National Institutes of Health.

While the primary mission of this Division is to provide the research programs with the highest degree of service efficiency and business know-how, the division is also charged with developing management techniques to assure a high degree of management control from the standpoint of both quantity and quality of service and economy and efficiency of operation.

With respect to types of service rendered, the Division's services range all the way from cleaning the laboratory buildings to preparing the payroll. The specific types of services provided are listed at the end of this statement.

*Prepared February, 1957, in connection with the Fiscal Year 1958 Appropriations Requests for the National Institutes of Health, Public Health Service, Department of Health, Education, and Welfare.

RELATIONSHIP OF SERVICES TO THE
RESEARCH ENVIRONMENT AND TO RESEARCH GROWTH

The primary objective of these services is to contribute to the maintenance of an environment that stimulates good and productive research. Just as the competence of the research staff is the biggest single factor in achieving high calibre research, the adequacy of resources including the effectiveness of technical and business services ranks equally high among those factors that help to create a high calibre research environment.

As the direct research programs of the NIH have grown in both size and diversity, they have also grown to be more complex. This growth and changing nature of research has been accompanied by consequent changes in the nature, size and diversity of supportive services. New and more complex services are constantly required to keep pace with program developments. So it is that in addition to the conventional business-type services such as personnel and payroll, we now have such special purpose services as radiation safety and a newly established contract research service.

While these service demands have been steadily increasing, the percentage of the research dollar devoted to supportive services has nevertheless steadily declined.

This is true both of this Division and the Division of Research Services. In the management of these services, the NIH has faced the continuing problem of constantly seeking

ways and means of assuring that the quantity and quality of service are readily responsive to research needs - and at the same time within the framework of maximum service efficiency and economy of operation.

DESCRIPTION OF SERVICES

Personnel

Personnel management at the NIH is oriented toward accommodating to the greatest extent possible the rules of Federal personnel administration to the specific needs of medical research, and toward relieving the research investigator of a large share of the mechanical paper work involved in furnishing him with supporting manpower needed to do his job. Operating largely through a "personnel generalist" system (i.e. a staff complement with across-the-board personnel skills as opposed to the individual personnel specialties such as classification, etc.), a substantial portion of personnel work is handled at the program level based on day-to-day staff-operating relationships. Originally initiated at NIH on an experimental basis, the generalist system has proven itself in experience and is now a firmly established practice.

The NIH also finances the expenses of a Board of Civil Service Examiners which is housed and operated as an adjunct to the Bethesda research operation. This Board, under the general guidance and supervision of the U. S. Civil Service

Commission, administers the program of recruitment and examination of applicants in a wide variety of scientific disciplines. There is a full-time, paid staff, but the Board itself is composed of NIH scientists who assume this part-time responsibility in addition to their regular research work. The Board's value to NIH lies in its closeness to and awareness of staffing needs of the various programs, and its work of designing and administering examinations best suited to meet research needs, all within the framework and general provisions of law and regulation.

Office Services

The Division furnishes a variety of services under this heading the largest of which is the provision of housekeeping or cleaning service to all buildings except the Clinical Center. Through special legislation (P.L. 781 - 80th Congress), the maintenance of NIH buildings and grounds is a direct responsibility of the NIH; accordingly, both the management and cleaning of office and laboratory space are financed and operated under this Division. Space management has been a problem of critical concern to the institutes during the recent and current periods of rapid growth. The cleaning of laboratory space differs sharply from the conventional cleaning requirements of the departmental office buildings. In a research operation, such problems as environmental sanitation and personal safety represent continuing considerations from a housekeeping standpoint.

In addition to space management and housekeeping, this service also includes the mail and file service, the operation of a telephone switchboard of 1,000 lines, operation of the motor pool, provision of transportation, and the elevator operation for all NIH buildings except the Clinical Center.

Plant Safety

The major services provided under this heading include 24-hour daily guard and fire protection for all NIH buildings and grounds; a program of personnel safety from industrial, hospital, radiation and laboratory hazards; civil defense planning; and physical security.

The guard service, like cleaning and space management, falls under maintenance authority and is provided solely by the NIH. The fire protection service provides around-the-clock protection in the event of laboratory, chemical or other fire emergency, as well as training and fire inspection services.

The safety service, in addition to concern with laboratory and hospital safety measures, also includes a specific radiation safety program to service the rapidly expanding radioisotope programs of the NIH.

Financial Management

Federal budgetary, accounting, auditing, and payroll-ing activities, like personnel operations, are highly complex, specialized procedures regulated through controls

of the General Accounting Office, Treasury, and Bureau of the Budget. The mission of the Division's financial management service is to implement and adapt these rules and regulations to meet the operational and research management needs of the NIH.

Research program needs from a financial standpoint can best be expressed in terms of stability and flexibility: stability of support to assure continuity for the successful conduct and completion of research studies; flexibility in the use of research funds to assure appropriate follow-through on promising research leads and scientific break-throughs. Financial management at the NIH seeks to reconcile these primary needs to the greatest extent possible within the framework of Federal fiscal controls and the conventional, annual appropriation structure.

In establishing financial controls, the service seeks to insure that the total operation is both economical and efficient, and that the total resources are effectively allocated among the several program areas. Care is exercised to assure that financial controls are established on a sound basis and one that can be effective without interfering with the substance of research and its need for fluidity of scientific approach and collaborative effort.

In the auxiliary service areas, the financial management service devotes continuing interest and effort to the development of workload reporting and other budgetary control systems, and to

the development of methods of financing designed to promote economies and to achieve the highest degree of cost-consciousness on the part of both research services and research investigators.

Procurement and Supply

This service is charged with furnishing or procuring the necessary material which the research investigator needs to do his job. In addition to assuring compliance with Federal procurement and supply regulations, the service must be well-grounded in research procurement and its highly specialized requirements for accuracy of specification, speed of delivery, and availability in terms of sources of supply.

In addition to research procurement, this service is also responsible for servicing the newly activated research contract program initially established to meet the contract research needs of Cancer Chemotherapy. Contract research is a new and recent development at the NIH, and one requiring a high degree of specialization on the part of the supporting service staff. This staff must be familiar with all the complexities which accompany the negotiating of research contracts both of a fixed price and a cost plus fixed fee nature in order to assure the best interests of both the Federal Government and the immediate research program concerned.

Finally, this service is responsible for property management including the administration of property and inventory controls, and conformance with appropriate Federal laws and regulations.



Management Analysis

The management analysis service consists of a small staff which provides a variety of organization and methods services to the several research programs. These services range from the study of internal Institute administrative procedures to the conduct of the NIH records and forms management programs.

Organization and methods studies are done upon request in both Institute and service areas. Contributions to the development of management improvements have been many, and these services, therefore, are in very frequent demand.

Also, the staff keeps abreast of and provides advice and assistance on: government-wide developments in the area of general management; changes in policy and procedure; and new developments in office machines and office equipment. This service also conducts a record management program aimed at achieving optimum conservation of filing equipment and records storage space; and a forms management program as a part of a government-wide program designed to achieve economies in procedures and paperwork.

Current emphasis is being given in cooperation with other staff groups (Financial Management, Animal Production, etc.) to the development of ways and means of achieving a closer service-to-program relationship in selected service areas. These studies are expected to lead to the development

of modified charge systems somewhat similar to systems currently used for the Instrument Shop and the animal feed and bedding operation.

SUMMARY

The primary objective of the Division of Business Operations is to provide the research investigator with the wherewithal to do productive research. Every effort is made to make the extent, scope and variety of service contingent upon and responsive to research needs.

TYPES OF SUPPORTING SERVICES
DIVISION OF BUSINESS OPERATIONS

<u>Personnel</u>	<u>Office Services</u>
Classification	Space Management
Employee Relations	Communications
Appointments and Records	Housekeeping (cleaning)
Employment	Transportation
Training	Motor Pool
Personnel Generalist Services	Moving and Hauling
Board of Civil Service Examiners	Administrative Services
<u>Financial Management</u>	<u>Plant Safety</u>
Budget	Safety
Analysis and Reports	Civil Defense
Accounting	Radiation Safety
Cost Accounting	Guard Services
Audit and Claims	Fire Protection
Payroll	<u>Management Analysis</u>
Agent Cashiering	<u>Procurement</u>
<u>Supply</u>	Purchasing
Property Accounting	Contracting
Supply and Stores	Research contracting
Shipping and Receiving	Printing
Animal Feed and Bedding	

BACKGROUND STATEMENT*
ON
DIVISION OF RESEARCH SERVICES

SERVICES IN SUPPORT OF RESEARCH

The medical scientist must have the support of highly skilled teams of auxiliary personnel to function efficiently. Moreover, if he is to make maximum progress in the collaborative campaigns to conquer disease, these teams of professionals and technicians must perform complex and wide-ranging tasks. To make effective contributions, a smooth and disciplined interrelation between the scientist and his supporting services must be assured. This has long been recognized in concept and practice at the National Institutes of Health, and its Division of Research Services' function is to provide many supporting services demanded by the maturing NIH program. Its work is earning a mounting increment of responsibility. A few examples illustrate the diversity and magnitude of the tasks accomplished by this Division.

COLLABORATION WITH THE SCIENTIST

During the past year, a neurologist studying the effects of brain damage in monkeys called on Division instrument technologists to develop a new type of micro-electrode. This is a wired needle that will be implanted in the brain as an approach to the study

*Prepared February, 1957, in connection with the Fiscal Year 1958 Appropriations Requests for the National Institutes of Health, Public Health Service, Department of Health, Education and Welfare.

of its electrical activity and function in health and disease. The collaborating scientist termed the device "an outstanding achievement in the physiological field." It is expected to be of great value in the study of epilepsy.

The Division's geneticists and veterinarians, collaborating in research on degenerative joint disease, successfully produced 18 strains of mice in which the disease closely resembles human form. Thus it is now possible to breed more strains of experimental animals that develop osteoarthritis, a condition afflicting to some degree most of our population over age 50.

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For the NIH scientists using experimental animals in their laboratories, the Division is helping to adapt a tank for the production of germ-free animals. This will permit studies hitherto impossible.

* * * *

Medical artists of the Division in collaboration with biologists and therapists engaged in cancer research, are well along in the development of a transparent plastic "head" for accurately predetermining dosages of radiation for cancer patients. A sensitive fluid is irradiated and then withdrawn from the "head" and measured.

* * * *

Photographic specialists developed a new technique for producing color reproductions of brain lesions which the scientists had caused to fluoresce by the introduction of special dyes.

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Glassware technologists are constantly producing special glass apparatus. For instance, pharmacologists and toxicologists in arthritis research required a triple still which would give three simultaneous distillations and would resist breakage under pressure or heat.

* * * *

Many of the problems presented to the Division can be solved only by considerable study and experimentation. These call for long-continuing collaboration with the scientists, and often what appears to be a simple device or solution may represent many months of diligent research and painstaking, skilled work.

CENTRALIZED SERVICES: SCIENTIFIC, TECHNICAL AND ENGINEERING

In general the Division provides technical and engineering support for the entire NIH. It operates and maintains the buildings and grounds; designs, engineers, remodels and participates in constructing buildings; produces and supplies the research animals and culture media used in the laboratories; offers biometric services and processes statistical data; provides technical services in plant sanitation and the control of insects and rodents; helps the scientist in reporting his results; and assists the several Institutes in the preparation of scientific exhibits,

photographs, slides, monographs, brochures, etc. It provides photography, medical art, library and translating services for all of NIH.

In addition, the Division is charged with responsibilities in two special areas: construction of buildings and a program of Russian translation, both of which are detailed in other statements.

PLANT ENGINEERING

The present plant for conducting research at NIH comprises 18 buildings, including the 14-story Clinical Center and auxiliary facilities. These buildings house patients, personnel, animals, and some of the most delicate apparatus ever devised by man. The setting for research is ever-changing, and facilities must be constantly modified to meet new needs of the advancing scientific frontier. Thus the housing of modern medical research demands a full-time engineering operation. The Division provides central engineering services for operating, preserving, repairing, and renovating the NIH facilities; for landscaping and maintaining the grounds; and for designing, fabricating, and servicing equipment associated with research projects.

RESEARCH FACILITIES PLANNING

A major concern of the Division is its role of assistance in the planning and design of all new construction and major alteration projects at NIH. This service includes preliminary planning, negotiations with

Public Buildings Service, liaison with PBS and contract architects, and the planning of facilities to house special research activities and equipment.

SCIENTIFIC REPORTS

No less essential to medical research than to an army in combat is an integrated and accurate system of communications. The Division aids in collecting and disseminating scientific information, and in guiding several thousand professional visitors each year to points of research interest. Related services in this area are provided for: technical editing, publications and reports, medical art and photography, management of special events, and the maintenance of a scientific library and translating unit for the entire Public Health Service.

LABORATORY AIDS

Provision of central services for research often involves research itself. This is readily apparent in the area of laboratory aids. Animals, instruments, culture media, and other tools of research must be developed as science advances, and this often necessitates the work of scientists and highly skilled technicians.

The Division produces and supplies animals that have been selectively bred for certain characteristics over more than a hundred generations. It provides a well-equipped animal hospital, studies the major veterinary problems related to research, and

devellops and supplies bacteriologic and tissue culture media for fundamental investigations. It fabricates and maintains pilot models of apparatus and glassware not available through commercial sources.

Part of the program necessitates important research on animals. An illustrative problem in experimental animal production is infantile diarrhea, a leading cause of death in laboratory mice. This problem is the subject of continuing studies. Other subjects constantly being researched are the use of antibiotics in animal diseases, the testing of supplements to animal diets, the improvement of cage design, and the control of diseases through the breeding of resistant strains.

In the field of laboratory aids, a limited program of basic research has been found not only fruitful in its own right, but also helpful in meeting a major problem of laboratories everywhere--the recruitment and training of competent personnel.

BIOMETRICS

Today's medical research, whether in the laboratory, hospital or field, is characterized by statistical evaluation and investigation--biometrics when applied to living subjects. In recent years biometrics has been much enhanced as a research tool by the application of electronic data-processing, and this field is being studied and utilized by the Division's biometry group. The Division provides central services in the over-all program of biometry at NIH, and in the use of biometric techniques in medical research.

SANITARY ENGINEERING

Another area of service rendered by the Division is that of sanitary engineering for all phases of sanitation at NIH. It is especially aimed at solving sanitation problems peculiar to hospital and laboratory environments, such as food sanitation, air hygiene, insect and rodent control, sanitary design features of new buildings and equipment, and control over the quality of distilled and other processed water. In the past year developmental work has progressed toward the rearing of germ-free animals for use in experiments where the only disease involved is that purposely transmitted to the subject by artificial means. Among other accomplishments were the design and development of a waste chemical disposal facility for NIH and a study of vibration problems associated with the use of highly sensitive laboratory equipment.

BACKGROUND STATEMENT*
TRANSLATION OF RUSSIAN
MEDICAL LITERATURE

ORIGIN AND OBJECTIVE

This new program, established at the National Institutes of Health to provide a service for American medical science, results from recognition of a need and the interest of Congress and the Institutes, Public Health Service, and Department of Health, Education, and Welfare in meeting this need. The last session of the Congress and subsequent discussions led to rapid implementation of the service, which is now well underway and developing progressively.

The objective of the program is to help American scientists keep up-to-date on Russian medical research findings through increasing and speeding up the translation and the dissemination of Soviet scientific medical literature. The new service of the Institutes is planned to accomplish in the biological and medical sciences objectives of similar purpose in the program of the National Science Foundation in the physical sciences, where translating services have been developed to cover the Soviet literature in these fields. Supplementing and complementing the National Science Foundation activities, as well as other public and private efforts

*Prepared February, 1957, in connection with the Fiscal Year 1958 Appropriations Requests for the National Institutes of Health, Public Health Service, Department of Health, Education, and Welfare.

in this country, the Russian scientific translation program is designed to increase the previously small volume of Russian medical literature available in English translation in the United States and to provide more adequate coverage and wider, faster service than has heretofore been available.

As the Congress noted, in its last session and following its Committees' hearings and discussions, here was a gap area, a place in need of immediate aid, the scope of which "should supplement other translation efforts to the degree required to provide adequate coverage." Immediately following Congress' actions, a tentative program was drafted and circulated among scientific groups and interested Federal agencies. Incorporating suggestions from these and with continuing coordination with these interested agencies and groups, a program comprised of a variety of projects was evolved and implemented as rapidly as possible. For the operation of this program, a preliminary budget of \$233,000 for Fiscal Year 1957 was earmarked by equitable contributions from the appropriations of the individual Institutes, as suggested by the Congress.

SUMMARY OF ACCOMPLISHMENTS

Only half of a year since its beginning, the new Russian Medical Science Translation Program is accomplishing the objective of better and faster communication of more of the results of Soviet medical and biological research to a variety of American professional groups and to more individual medical

researchers in this country. This is shown by the response to and the comments upon the new program received by the National Institutes of Health; many statements have been received testifying to the acceptance and impact of the translation program and to the fact that a need existed which is now beginning to be well met.

Here are some of the initial accomplishments in summary form:

Initial issues of two journals, published by Consultants Bureau, have been distributed to 300 medical libraries and 80 Government installations.

Six more journals to be published under contract resulting from competitive bids.

Seventy editors of American specialty journals invited to select papers from Russian counterpart journals for translation.

Grant of \$40,000 made to Excerpta Medica Foundation to translate and publish Soviet abstracts in cancer, physiology and pharmacology, infectious diseases, and internal medicine.

Contract signed for publication of Russian-English medical dictionary by Academic Press.

Preliminary edition of a directory of 489 Soviet medical research institutes ready to be sent to printer.

Special Libraries Association submitting grant application for support of translation pool to February Council sessions.

Preliminary selection made of monographs for translation; Selection Panel being organized for meeting in February.

Guide to Translation Services at Government Printing Office with anticipated March publication date.

Annotated bibliography of reports by scientific visitors to the U.S.S.R. compiled and ready for duplication.

Twenty-five sets of American Review of Soviet Medicine bought for request distribution.

Contract study of scientists' practices and prejudices in acquiring information from Soviet sources half completed.

ACTIVITIES OF THE PROGRAM

A variety of activities have been undertaken, and experience thus far shows that this method, instituting projects aimed particularly at several gaps and areas in need of reinforcement, is proving successful in moving toward a broadly based, flexible program that will best serve the needs of American medical science. Thus, the program, at present and as planned for the ensuing months of this Fiscal Year and those of Fiscal Year 1958, is comprised of a number of activities and projects. Some of these, to date and as continuing activities, are summarized below as of interest.

I. Journal Translation

Since original scientific research is primarily reported in journal literature, the device of cover-to-cover translation of scientific journals has been used by the National Science Foundation, the Atomic Energy Commission, and the National Institute of Health. At the start of the program a comprehensive list of Soviet journals in biology and medicine was circulated to Government agencies and to qualified advisers. On the basis of their recommendations, the following list of journals was selected for cover-to-cover translation:

Biofizika (Biophysics)

Biokhimiia (Biochemistry)

Biulleten Eksperimentalnoi Biologii i Meditsiny
(Bulletin of Experimental Biology and Medicine)

Fiziologicheskii Zhurnal S.S.S.R. im. I. M. Sechenov
(I.M. Sechenov Physiological Journal of the U.S.S.R.)

Problemy Gematologii i Perelivaniia Krovi (Problems
Hematology and Blood Transfusion)

Voprosy Onkologii (Problems of Oncology)

Voprosy Virusologii (Problems of Virusology)

Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii
(Journal of Microbiology, Epidemiology & Immunobiology)

As a first accomplishment, 400 copies of translations of the Soviet journals Biochemistry and the Bulletin of Experimental Biology and Medicine were secured for distribution to a list of 300 American medical libraries developed for us by the Medical Library Association. The additional 100 copies have been marked for distribution to governmental research installations, principally in the Army, Navy, Air Force and Veterans Administration. The first issues of these two translated journals have been distributed. The specifications for the translation and publication of the remaining six journals have been drawn, and publication of the first issues of these journals may be expected by April. The specifications call for letterpress, for high-quality reproduction of illustrations, and for prompt publication following the appearance of the Russian original.

The majority of the above journals are in broad basic science fields. In order to provide for the specialized research or clinical fields, we have developed a sub-project. Letters were written to 70 editors of specialty journals

offering to send them photostats of the Contents pages of Russian journals in the same specialty. The editors were invited to select papers for translation with the expectation, but not the requirement, that they be published. This plan has the dual advantage of insuring informed selection, and of disseminating the information in channels of proved acceptability. Thirty-five editors have replied accepting our invitation; machinery has been set up with the National Library of Medicine to provide the photostats and specifications for a contract to cover an estimated 1,500 pages of Russian text have been drawn.

II. Medical Abstracts

Excerpta Medica Foundation, through grant support, is to translate and publish the following four sections of the Soviet Medical Reference Review:

Microbiology and Infectious Diseases

Normal and Pathological Physiology, Biochemistry,
Pharmacology, Toxicology

Oncology

Internal Disease

Work has been begun and is proceeding, and additional plans are being made for further medical abstracts in selected fields.

III. Russian-English Medical Dictionary

Mr. Stanley Jablonski of the National Library of Medicine has signed a contract with Academic Press, New York,

for the publication of a much needed Russian-English medical dictionary. The 25,000 terms collected by Mr. Jablonski will be reviewed and edited by Dr. Benjamin S. Levine, retired Public Health Service Officer, for their scientific accuracy. The National Institutes of Health will purchase 400 copies of this dictionary for distribution to medical libraries and government agencies. Copy will start to the printer in January and publication in the Fall of 1957 is anticipated.

IV. Directory of Soviet Research Institutes

Following a series of editorial revisions, a list of 489 Soviet research institutes in the biological and medical sciences is ready at this writing for offset reproduction and distribution. The preliminary edition is being sent to the Academy of Medical Sciences with a request for editorial cooperation. An edition of 750 copies is planned, 400 of which will be distributed by the National Institutes of Health.

V. Guide to Translation Services

Through cooperation of the National Library of Medicine, a guide to scientific translation services in the United States and abroad has been revised and expanded. The guide will be issued as a PHS numbered publication; it is now at the printer's and delivery is expected in March.

VI. Translation Center

By accord with the National Science Foundation, the National Institutes of Health has agreed to share the support

of the national cooperative translation pool of scientific and technical translations sponsored by the Special Libraries Association and located in the John Crerar Library, Chicago.

VII. Monographs

The problem of selecting monographs for translation has proved to be a major one. A check of the weekly bibliographic record, Knizhnaya Letopis', for 10 years shows a publishing level of 25,000 titles in biology and medicine, or an average 2,500 per year. Selection of titles will be referred to an Advisory Panel of scientists, who will meet in Bethesda in February. Preliminary selection of the panel, and of a suggested list of monographs has been accomplished, and the basic principles underlying such selection have been determined.

VIII. Review Papers

This project involves review papers which would systematically evaluate little-known activities in Soviet medical research. The February Advisory Council meetings will have for consideration two grant applications for support of the work necessary to produce English language reviews--one by Dr. Williamina A. Himwich to review Soviet literature on the "Blood-Brain Barrier," and one by Dr. Benjamin S. Levine, on a subject not yet determined.

IX. Reports of Scientific Visitors

As a contribution to the evaluation of Soviet scientific achievements, we have prepared an annotated bibliography of

published and unpublished reports of recent scientific visitors to the Soviet Union. The manuscript on this is complete; it will be reproduced by offset and distributed both to the standard distribution list of medical and scientific groups and libraries, etc., and by Public Health Service channels.

Evaluation of the Program

In order to provide for a more informed development of the program and to evaluate the devices undertaken to date, the National Institutes of Health entered into a contract with the Herner, Meyer Company to study the techniques used by medical scientists in acquiring their research information. While primarily oriented to Russian information, this study will also develop the base lines of the scientist's practices in locating his information generally. Five hundred interviews are being conducted in medical schools, pharmaceutical laboratories, and governmental and private research centers by a questionnaire. The data will be evaluated and submitted to the National Institutes of Health in the form of a report due in March 1957.

Projection of the Program

In continuing the program for Fiscal Year 1958, it is essential to maintain commitments already established. Translation of eight journals, the translation of abstracts, support for the translation center, and the preparation of reviews and the translation of monographs constitute the core of the program. As authorized by the Committee, approximately \$233,000 from

Fiscal Year 1957 appropriations of the Institutes has been allocated for the program. Several features of the Fiscal Year 1957 program are self-limiting, and it is expected that the level of activities can be maintained in Fiscal Year 1958 with a budget of approximately \$175,000.

BACKGROUND STATEMENT*
ON
NIH - NURSING

Although there has been improvement during the past year, the shortage of professional nurses at the NIH Clinical Center remains one of our most difficult problems. The vital role of nurses in the Armed Services and in civilian hospitals, clinics and doctors' offices is known to everyone. Less well recognized is the fact that local and State public health services, schools and the Nation's expanding industrial health programs are equally dependent on graduate nurses; that airlines, ships, railroads, department stores, and other kinds of businesses increasingly need nurses in their programs; and that many thousands of nurses are needed for private duty in the homes of sick people.

The sustained high level of general prosperity, the spectacular gains in prepaid hospitalization programs, and the yearly increases in our population have combined to create, sustain, and, I am afraid, to increase the Nationwide shortage of professional nurses. This national deficit is said to be in the neighborhood of 70,000.

At the Clinical Center 309 professional nurses were on duty at the end of the year 1956, an increase of 48 over the preceding year. This gain was due primarily to the nationwide recruiting campaign launched by NIH during 1956, in conjunction with the other bureaus of the Public Health Service. At the

*Prepared February, 1957, in connection with the Fiscal Year 1958 Appropriations Request for the National Institutes of Health, Public Health Service, Department of Health, Education, and Welfare.

same time, continuous examination is being made of Clinical Center nursing procedures to find ways of using more effectively not only professional nurses but also practical nurses and nursing aides. A similarly sustained effort is made to reduce the turnover rate in the nursing staff.

Nursing the average research patient is far more exacting and time-consuming than providing for the average general or special hospital patient. For this reason, the level of bed activation and use, the volume and, to some extent, the kind of clinical research at NIH, must all be geared to the number of professional nurses on the staff.

The following table provides actual and estimated data on Clinical Center bed activation, admissions and patient days available for fiscal years 1956 through 1958.

	<u>1956</u>	<u>1957*</u>	<u>1958*</u>
Level of bed activation reached.....	443	516	516
Bed days available.....	145,145	179,499	188,340
Patient days available.....	102,793	133,070	140,510
Nursing Units in operation.	20	23 ²⁴	23 ²⁴
In-bed admissions.....	2,112	2,600	2,800
Outpatient visits.....	18,575	20,000	26,000

*Includes Mental Health Institute Children's Residential Treatment Center to be activated in May 1957.

There are grounds for a reasonable optimism that the shortage of Clinical Center nurses and certain other scarce personnel will diminish during the next year or two. The nurse recruiting program of the Public Health Service, supplemented by special NIH effort, will be prosecuted with vigor. Study and action directed against the turnover rate will be continued. Orientation and training of nursing department personnel and analyses of their role in the total patient care and clinical research program will be maintained.

Ultimately, however, we come back to the national situation and what is being done about it. The total number of professional nurses employed in the United States, it is reported, has increased by 28,000 in two years-- a substantial increase. The demand for nurses, however, mounts more rapidly, chiefly because of the marked advance of medical science and in the number of people who seek its benefits.

Research in nursing will help solve some of its major problems and give us, for example, improved ways to manage services for best effect on patients and for economical use of scarce personnel. A continuation of funds both for research grants and intramural research in nursing this year will be of great value.

The categorical research grant programs of NIH, too, take cognizance of nursing. Heart and cancer funds will assist in a few projects to help leading teachers of nurses learn the new methods of caring for patients with cancer and heart disease.

The traineeship program for teachers, administrators and supervisors will enable more nurses to enter these fields and master the new knowledge from clinical and laboratory research and from nursing research, and then to pass that knowledge on to the students they teach and the nurses they supervise. These are strategic and fundamental approaches to interesting more candidates in the nursing profession and securing more and better service for people who need it.

The Chief Nurse Officer of the Public Health Service has furnished the following tabulation and explanatory statements regarding the national situation.

PROFESSIONAL NURSE SUPPLY AND SHORTAGE

Total number of professional nurses employed in the U.S... 430,000

Number employed in hospitals....266,000--60% of total

Increase in total employment over 1954..... 28,000

This increase is greater than that provided by the excess of new graduates entering the profession over estimated retirements. It indicates that a larger number of married nurses are reentering the profession.

Part-time employment of nurses has increased

36,000 - 1954

42,000 - 1956

(These are included in the 430,000 above)

Estimated national shortage of professional nurses..... 70,000

Schools of Nursing

Total number 1,145

Total enrollment 110,000 - 1956
(97,900 - 1950)

Admissions -- 1956 47,000

It is estimated that the schools could have admitted 3,000 more students in 1956. Most of the better schools are filled to present capacity with the exception of a few high cost collegiate schools.

The capacity of the schools is insufficient to accommodate the expected increase in enrollment when the marked increase in 18-year olds begins about three years from now.

Chief bottlenecks are:

Scarcity of teachers (hence the nursing teacher traineeship program);

Lack of physical facilities -- classrooms, laboratories, libraries, administrative space, and student residences;

Funds to secure faculty (when available), and facilities.

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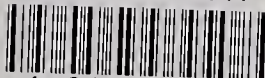
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